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09/810,387	03/15/2001	Craig M. Carpenter	MI22-1559	8779
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WELLS ST. JOHN P.S. 601 W. FIRST AVENUE, SUITE 1300 SPOKANE, WA 99201			EXAMINER ZERVIGON, RUDY	
			ART UNIT 1763	PAPER NUMBER
DATE MAILED: 03/27/2006				

Please find below and/or attached an Office communication concerning this application or proceeding.

# Office Action Summary

Application No.

09/810,387

Applicant(s)

CARPENTER ET AL.

Examiner

Rudy Zervigon

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

## Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

## Status

- 1) ☒ Responsive to communication(s) filed on 09 January 2006.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

## Disposition of Claims

- 4) ☒ Claim(s) 1-29,37-44 and 46 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-29,37-44 and 46 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

## Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 15 March 2001 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

## Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
  - ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

## Attachment(s)

- |  |   |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892)   | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                                   | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)             |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____  |

## **DETAILED ACTION**

### ***Specification***

1. The amendment filed April 21, 2005 is objected to under 35 U.S.C. 132 because it introduces new matter into the disclosure. 35 U.S.C. 132 states that no amendment shall introduce new matter into the disclosure of the invention. The added material which is not supported by the original disclosure is as follows: "Process chemical 102 may pass through an optional distribution showerhead 104, known to those of ordinary skill, within chamber 84".

Applicant is required to cancel the new matter in the reply to this Office Action in all of the specification, claims, and drawings.

### ***Claim Rejections - 35 USC § 112***

2. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

3. Claim 44 is rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the enablement requirement. The claim contains subject matter which was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention. Applicant's claimed "showerhead" is not described in the specification.

### ***Claim Rejections - 35 USC § 102/103***

4. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

5. Claims 41, 42, and 46 are rejected under 35 U.S.C. 102(b) as anticipated by Posa; John G. (USPat. 4,747,367) or, in the alternative, under 35 U.S.C. 103(a) as obvious over Posa; John

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G. (USPat. 4,747,367). Posa; John G. (USPat. 4,747,367). Posa teaches a chemical (56; Figure 1; column 5, lines 33-57) vapor deposition apparatus (Figure 4; column 7, line 57 - column 8, line 14) comprising: a deposition chamber (16; Figure 2,4; column 7, line 57 - column 8, line 14) having a lid (100; Figure 2; 300, Figure 4; column 7, line 57 - column 8, line 14); a valve body (100/300, 102, 114, 110, 112, 118, 120; Figure 4; column 6, lines 13-40) including a portion of the lid (100; Figure 2; 300, Figure 4; column 7, line 57 - column 8, line 14) as part of the valve body (100/300, 102, 114, 110, 112, 118, 120; Figure 4; column 6, lines 13-40), the valve body (100/300, 102, 114, 110, 112, 118, 120; Figure 4; column 6, lines 13-40) being adapted to receive external control signals (28; Figure 1; column 4, lines 56-65) selectively shutting off flow of a process chemical (56; Figure 1; column 5, lines 33-57) into the chamber (16; Figure 2,4; column 7, line 57 - column 8, line 14), adjusting the flow rate of the chemical (56; Figure 1; column 5, lines 33-57) into the chamber (16; Figure 2,4; column 7, line 57 - column 8, line 14), or both; and a valve stem (114; Figure 1) that moves inward to the chamber (16; Figure 2,4; column 7, line 57 - column 8, line 14) to allow or to increase flow of process chemical (56; Figure 1; column 5, lines 33-57) into the chamber (16; Figure 2,4; column 7, line 57 - column 8, line 14) and moves outward from the chamber (16; Figure 2,4; column 7, line 57 - column 8, line 14) to shut off or to decrease process chemical (56; Figure 1; column 5, lines 33-57) flow into the chamber (16; Figure 2,4; column 7, line 57 - column 8, line 14), as claimed by claim 41

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Posa is not clear in either Posa's specification or Posa's not-to-scale drawings as to the relative thickness of Posa's lid (100; Figure 2; 300, Figure 4; column 7, line 57 - column 8, line 14) and Posa's chamber body chamber (16; Figure 2,4; column 7, line 57 - column 8, line 14)<sup>1</sup>.

Fuki is also not clear if his lid (top tapered portion of 14) is removable.

In the event that Posa is not deemed to anticipate Applicant's claimed invention of "similar thickness" between Posa's lid and Posa's chamber body, or that Posa is not deemed to anticipate Applicant's claimed invention of "cylindrical body":

It would have been obvious to one of ordinary skill in the art at the time the invention was made for Posa to optimize the relative dimension of Posa's lid and Posa's chamber body.

Motivation for Posa to optimize the relative dimension of Posa's lid and Posa's chamber body is for scaling Posa's deposition apparatus to accommodate larger substrates. Further, it is well established that changes in apparatus dimensions are within the level of ordinary skill in the art. (Gardner v. TEC Systems, Inc. , 725 F.2d 1338, 220 USPQ 777 (Fed. Cir. 1984), cert. denied , 469 U.S. 830, 225 USPQ 232 (1984); In re Rose , 220 F.2d 459, 105 USPQ 237 (CCPA 1955); In re Rinehart, 531 F.2d 1048, 189 USPQ 143 (CCPA 1976); See MPEP 2144.04)

6. Claims 1, 2, 4-23, 25-29, and 46 are rejected under 35 U.S.C. 102(b) as anticipated by Fukui et al (USPat. 5,002,928) or, in the alternative, under 35 U.S.C. 103(a) as obvious over Fukui et al (USPat. 5,002,928). Fukui teaches a deposition apparatus (Figure 1) for depositing superconducting films (column 2, lines 14-36). Although Fukui does not discuss CVD (chemical vapor deposition) operations, it has been held that claim language that simply specifies an

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<sup>1</sup>Proportions of features in a drawing are not evidence of actual proportions when drawings are not to scale. Because the reference does not disclose that the drawings are to scale and is silent as to dimensions, arguments based on measurement of the drawing features are of little value. However, the description of the article pictured can be relied on, in combination with the

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intended use or field of use for the invention generally will not limit the scope of a claim (Walter , 618 F.2d at 769, 205 USPQ at 409; MPEP 2106). Additionally, in apparatus claims, intended use must result in a structural difference between the claimed invention and the prior art in order to patentably distinguish the claimed invention from the prior art. If the prior art structure is capable of performing the intended use, then it meets the claim (In re Casey, 152 USPQ 235 (CCPA 1967); In re Otto , 136 USPQ 458, 459 (CCPA 1963); MPEP 2111.02).

Fukui further teaches a deposition chamber (14) defined partly by a chamber body (“solution-escaping inhibitor”; column 5, lines 1-2) including a lid<sup>2</sup> (top tapered portion of 14). Fukui further teaches a needle valve / isolation mechanism (6) that seals fluid flow between an outermost (outside chamber 14) and innermost (inside chamber 14) surface of the chamber body (14; column 4, lines 53-59). The lid (top tapered portion of 14) being integral to the isolation mechanism (6) such that the isolation mechanism (6) would be incomplete, nonfunctional, or otherwise not able to isolate material from reaching the chamber absent the lid (top tapered portion of 14). Fukui further teaches a part of the valve housing (inside surface of 7; Figure 1; column 4; lines 28-31, 36-39, 53-60) between the innermost (inside chamber 14) and outermost surfaces (outside chamber 14) of the chamber body (14; column 4; lines 28-31, 36-39, 53-60). Fukui further teaches the valve body (1) including a portion of the chamber body (14) as at least a part of the valve housing (column 4; lines 28-31, 36-39, 53-60). Fukui further shows, the valve body (1) having an entirety of a seat (inside surface of 7; Figure 1; column 4; lines 28-31, 36-39, 53-60) within the chamber lid (top tapered portion of 14). The seat (inside surface of 7; Figure 1; column 4; lines 28-31, 36-39, 53-60) forming a part of the chamber lid (top tapered portion of

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drawings, for what they would reasonably teach one of ordinary skill in the art. (In re Wright, 193 USPQ 332 (CCPA 1977). MPEP 2125.

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14) or body. Fukui further teaches at least a part of the process chemical inlet (11) to the valve body (1) between the innermost and outermost surfaces of the chamber body, and wherein the chamber body (14) forms a part of a material inlet (11,12). Fukui further teaches the part of the valve housing (fitting in 14 for valve 1) comprised by the portion of the lid is defined by a cylindrical opening (conduit for stem 3; column 4, line 34) in the lid. The valve body (1) further comprising a stem (3) coincident with the central axis of the cylindrical opening at least partially within the cylindrical opening. Fukui further teaches:

- i. The entirety of the valve seat (inside surface of 7; Figure 1) is between an innermost surface of the lid inside the chamber and an outermost surface of the lid outside the chamber (Figure 1)
- ii. The part of the valve seat (6/7 interface) comprised by the portion of the lid is defined by a beveled and annular lid surface around a cylindrical opening through the lid, the valve body further comprising a plug (6) complementary to the beveled lid surface - see vertical and slanted tapering at the 6/7 interface in Figure 1
- iii. A deposition chamber (14) defined in part by a cylindrical chamber body and a single-piece with a circumference corresponding to a shape and a size of the chamber body (14) where it joins with the lid, the chamber body (14) size being selected to accommodate a semiconductor wafer (17) during CVD when such wafer is parallel to the lid (top tapered portion of 14) – claim 15
- iv. a deposition chamber (14) defined in part by a cylindrical body (14; “solution-escaping inhibitor”; column 5; lines 1-2) and a circular lid (top tapered portion of 14) matched to a

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<sup>2</sup> Lid – 5: something that confines, limits, or suppresses - Merriam-Webster’s Collegiate Dictionary - 10th Ed. p.671

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diameter of the cylindrical body (14; “solution-escaping inhibitor”; column 5; lines 1-2); an opening (7/6 interface) formed through a thickness of the lid (top tapered portion of 14), the opening (7/6 interface) defining at least a part of a valve seat (inside surface of 7; Figure 1); and a valve assembly (5-7) positioned to match a valve plug (6) or diaphragm with the valve seat (inside surface of 7; Figure 1) – claim 44

- v. A chemical vapor deposition apparatus (Figure 1) comprising a deposition chamber (14) defined in part by a cylindrical body and a circular lid (top tapered portion of 14) matched to a diameter of the cylindrical body (14; “solution-escaping inhibitor”; column 5; lines 1-2); an opening (conduit holding 6) formed through a thickness of the lid (top tapered portion of 14), the opening (conduit holding 6) defining at least a part of a valve seat (inside surface of 7; Figure 1); and a valve assembly (2-6; Figure 1) positioned to match a valve plug (6; Figure 1) or diaphragm with the valve seat (inside surface of 7; Figure 1), as claimed by claim 45

Fukui is not clear in either Fukui’s specification or Fukui’s not-to-scale drawings as to the relative thickness of Fukui’s lid and Fukui’s chamber body (see Figure 1)<sup>3</sup>. Fuka is further not clear as to whether Fukui’s deposition chamber (14) is defined in part by a “cylindrical body” (14; “solution-escaping inhibitor”; column 5; lines 1-2).

Fukui is also not clear if his lid (top tapered portion of 14) is removable.

In the event that Fukui is not deemed to anticipate Applicant’s claimed invention of “similar thickness” between Fukui’s lid and Fukui’s chamber body, or that Fukui is not deemed to anticipate Applicant’s claimed invention of “cylindrical body”:

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<sup>3</sup>Proportions of features in a drawing are not evidence of actual proportions when drawings are not to scale. Because the reference does not disclose that the drawings are to scale and is silent as to dimensions, arguments based on measurement of the drawing features are of little value. However, the description of the article pictured can be relied on, in combination with the



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It would have been obvious to one of ordinary skill in the art at the time the invention was made for Fukui to optimize the relative dimension of Fukui's lid and Fukui's chamber body.

Motivation for Fukui to optimize the relative dimension of Fukui's lid and Fukui's chamber body is for scaling Fukui's deposition apparatus to accommodate plural nozzle structures as taught Fukui (column 3, lines 29-33). Further, it is well established that changes in apparatus dimensions are within the level of ordinary skill in the art. (Gardner v. TEC Systems, Inc., 725 F.2d 1338, 220 USPQ 777 (Fed. Cir. 1984), cert. denied, 469 U.S. 830, 225 USPQ 232 (1984); In re Rose, 220 F.2d 459, 105 USPQ 237 (CCPA 1955); In re Rinehart, 531 F.2d 1048, 189 USPQ 143 (CCPA 1976); See MPEP 2144.04)

7. Claims 3 and 37-40 are rejected under 35 U.S.C. 103(a) as being unpatentable over Fukui et al (USPat. 5,002,928). Fukui is discussed above. Fukui does not teach that the relative dimensions between Fukui's seat, chamber lid thickness, and chamber lid width as shown by Fukui's Figure 1.

It would have been obvious to one of ordinary skill in the art at the time the invention was made for Fukui to optimize the relative dimensions of Fukui's seat, chamber lid thickness, and chamber lid width.

Motivation for Fukui to optimize the relative dimensions of Fukui's seat, chamber lid thickness, and chamber lid width is to provide for added structural integrity and/or to accommodate a requisite dimension of the substrate (17, Figure 1), further, for scaling Fukui's deposition apparatus to accommodate plural nozzle structures as taught Fukui (column 3, lines 29-33). Further, it is well established that changes in apparatus dimensions are within the level of

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drawings, for what they would reasonably teach one of ordinary skill in the art. (In re Wright, 193 USPQ 332 (CCPA 1977). MPEP 2125.

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ordinary skill in the art.(Gardner v. TEC Systems, Inc. , 725 F.2d 1338, 220 USPQ 777 (Fed. Cir. 1984), cert. denied , 469 U.S. 830, 225 USPQ 232 (1984); In re Rose , 220 F.2d 459, 105 USPQ 237 (CCPA 1955); In re Rinehart, 531 F.2d 1048, 189 USPQ 143 (CCPA 1976); See MPEP 2144.04). Further, proportions of features in a drawing are not evidence of actual proportions when drawings are not to scale. Because the reference does not disclose that the drawings are to scale and is silent as to dimensions, arguments based on measurement of the drawing features are of little value. However, the description of the article pictured can be relied on, in combination with the drawings, for what they would reasonably teach one of ordinary skill in the art. (In re Wright,193 USPQ 332 (CCPA 1977). MPEP 2125.

8. Claim 24 is rejected under 35 U.S.C. 103(a) as being unpatentable over Fukui et al (USPat. 5,002,928) in view of Waterfield (USPat. 4,319,737). Fukui is discussed above. However, Fukui does not teach a diaphragm valve. Waterfield teaches a diaphragm valve (Figure 1).

It would have been obvious to one of ordinary skill in the art at the time the invention was made for Fukui to replace his needle valve with Waterfield's diaphragm valve.

Motivation for Fukui to replace his needle valve with Waterfield's diaphragm valve is to provide an alternate and equivalent valve for delivering process fluids.

9. Claim 43 is rejected under 35 U.S.C. 103(a) as being unpatentable over Posa; John G. (USPat. 4,747,367) in view of Fukui et al (USPat. 5,002,928). Posa is discussed above. Posa does not teach a beveled lid (100; Figure 2; 300, Figure 4; column 7, line 57 - column 8, line 14) surface around a cylindrical opening (16; Figure 4) through the lid (100; Figure 2; 300, Figure 4; column 7, line 57 - column 8, line 14), the valve body (100/300, 102, 114, 110, 112, 118, 120;

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Figure 4; column 6, lines 13-40) further comprising a plug (112; Figure 2,4) complementary to the beveled lid (100; Figure 2; 300, Figure 4; column 7, line 57 - column 8, line 14) surface.

Fukui is discussed above. Fukui further teaches beveled and annular lid surface around a cylindrical opening through the lid, the valve body further comprising a plug (6) complementary to the beveled lid surface - see vertical and slanted tapering at the 6/7 interface in Figure 1

It would have been obvious to one of ordinary skill in the art at the time the invention was made to optimize the dimension of Posa's lid (100; Figure 2; 300, Figure 4; column 7, line 57 - column 8, line 14) surface around a cylindrical opening (16; Figure 4) as taught by Fukui.

Motivation to optimize the dimension of Posa's lid (100; Figure 2; 300, Figure 4; column 7, line 57 - column 8, line 14) surface around a cylindrical opening (16; Figure 4) as taught by Fukui is for optimizing flow rates through gas conduits as is known in the art. Further, it has been held that, where the only difference between the prior art and the claims was a recitation of relative dimensions of the claimed device and a device having the claimed relative dimensions would not perform differently than the prior art device, the claimed device was not patentably distinct from the prior art device (*Gardner v. TEC Systems, Inc.*, 725 F.2d 1338, 220 USPQ 777 (Fed. Cir. 1984), cert. denied, 469 U.S. 830, 225 USPQ 232 (1984), MPEP 2144.04).

10. Claim 44 is rejected under 35 U.S.C. 103(a) as being unpatentable over Fukui et al (USPat. 5,002,928) in view of Jeong, Kyung Cheol (USPat. 5,853,484). Fukui is discussed above. Fukui further teaches a deposition apparatus as discussed above including a deposition chamber (14; Figure 1) defined in part by a cylindrical body and a circular lid (top tapered portion of 14) matched to a diameter of the cylindrical body; an opening (7; Figure 1) formed through a thickness of the lid, the opening defining at least in part of a valve seat (tapered 6/7

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interface; Figure 1); a valve assembly (7) positioned to match a valve plug (6; Figure 1) or diaphragm with the valve seat (tapered 6/7 interface; Figure 1).

Fukui does not teach a distribution showerhead positioned to receive deposition gas from the opening when the valve assembly is in an open position.

Jeong teaches valve bodies (32-1; Figure 2) adapted to receive external control signals (22; Figure 2; column 3, lines 1-19) for delivering process gasses to Jeong's CVD chamber (10; Figure 2; column 2; lines 15-22). Jeong further teaches a gas distribution showerhead manifold (19; Figure 2) positioned to receive CVD deposition gases (abstract) from an opening (16; Figure 2).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to add Jeong's gas distribution showerhead to Fukui's deposition apparatus.

Motivation to add Jeong's gas distribution showerhead to Fukui's deposition apparatus is for achieving CVD film thickness uniformity as taught by Jeong (column 3; lines 11-15) in CVD operations.

### ***Response to Arguments***

11. Applicant's arguments with respect to claims 41, and 42 have been considered but are moot in view of the new grounds of rejection.

12. Applicant states "Page 2 of the office action does not acknowledge Applicant's prior assertions not provide any rebuttal". The Examiner disagrees. The Examiner has fully considered Applicant's assertion, however, the Examiner maintains his specification objection and 1<sup>st</sup> paragraph rejection. The Examiner's rebuttal is the re-affirmation of the Examiner's specification

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objection and 1<sup>st</sup> paragraph rejection as guided by 35 U.S.C. 112, first paragraph, as failing to comply with the enablement requirement.

13. The Examiner's response to arguments based on amended claims 1, 9, 15, and 27, are within the body of the Examiner's rejections.

### *Conclusion*

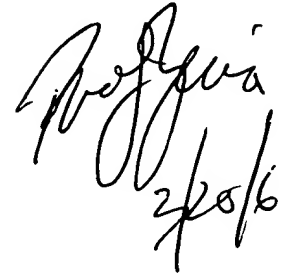
14. Applicant's amendment necessitated the new grounds of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

15. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Examiner Rudy Zervigon whose telephone number is (571) 272.1442. The examiner can normally be reached on a Monday through Thursday schedule from 8am through 7pm. The official fax phone number for the 1763 art unit is (703) 872-9306. Any Inquiry of a general nature or relating to the status of this application or proceeding should be directed to the Chemical and Materials Engineering art unit receptionist at (571) 272-1700. If the

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examiner can not be reached please contact the examiner's supervisor, Parviz Hassanzadeh, at  
(571) 272-1435.



Handwritten signature of Parviz Hassanzadeh, dated 2/28/6.